

Delta Crypto Platform

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April 21, 2018

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version 1.0

Annotation: Delta is a new crypto platform with own cryptocurrency, which combines the best practices in the field of blockchains, DAGs, crypto currencies and smart contracts. Fast transactions, low commissions, verified contracts, own blockchain and crypto constructors make Delta one of the advanced project. Delta smart contracts are based on the theory of semantic programming developed by academic Ershov Y.L. and my teachers academic Goncharov S.S. and professor Sviridenko D.I. in the 80-90s [3,4,5,6,7]. Then in works [1,2] we announced Δ_0 -terms and proved some principles, this help us created real verified semantic contracts with polynomial complexity. Delta platform is perfect for large and small companies, microfinance and IoT, for those who need own blockchain and cryptocurrency without commissions.

Structure Delta WhitePaper

- 1) Delta info
- 2) Delta multi-blockchain and DAGs
- 3) Delta smart contracts

1. Delta info.

Delta - it's new technology crypto platform with fast speed transactions, own cryptocurrencies, constructor of blockchains and verified smart contracts. Main goal Delta - it's fast and cheap transactions in crypto systems. Delta it's the good platform for Internet of Things (IoT) and micro finance, where we will add many data and cost transactions will be low. Internet of Things - it's very big direction with billions market capitalisations.<http://delta.money>.

2. Delta blockchain

For the development of the Delta blockchain, we took the best solutions from systems such as Bitcoin, Ethereum and IOTA. Moreover, in addition to the simple blockchains, we will talk about other data storage structures: multi-blockchains, DAGs and data structures used in torrent systems, which we will discuss in a separate chapter. Moreover, we will also discuss about algorithm of consensus to ensure the solidity information.

2.1 Delta Master Blockchain

The storage of all main operations - it's a Delta Master Blockchain(DMB). In

DMB we stored all information about Delta coins transactions, smart contracts what was deployed in DMB. Also each user can create new blockchains(DAGs) and saved hashes and params all users blockchains with own cryptocurrency. DMG have own cryptocurrency Delta coin and cost of transactions. DMB similar with Ethereum blockchain. New blocks will generate in average 1 sec. DMB have data limit in 10MB.

2.2 Delta Users Structures

Any user can create own decentralized structure. Such as blockchains, DAGs, Databases and etc. User can set settings privacy for own structure on read, write, share: public, friends, private. When user generated own decentralized structure, this information deploy in DMB. Total amount all users structures equal 2^{32} .

2.2.1 Delta Users Blockchains Blockchain it's most popular decentralized data storage. Each user can create own blockchain with own blockchain and cryptocurrency params.

When user generating new blockchain, in DMB will create a new transactions with next params: type of structure, structure id, owner id,

2.2.2 Delta Users DAGs DAG (Directed Acyclic Graph) it's good alternative to blockchain technology. Many cryptocurrencies based on DAGs. DAG systems have not miners and blocks, users confirm each other's transactions via a process that confirms previous transactions with each new transaction. Because there are no blocks, there is no blocksize issue. DAGs have a some best properties: fast transactions speed, transactions without commissions, big data volumes. Delta allow each user create own DAG structure with individual params and cryptocurrency.

2.2.3 Example: generate user blockchain

Structure id: 0xYYYYA2E95FA30d005F629cBe6c6d2887D979ffF2A

Owner id: 0xXXXC45Dd60aE4dBE5055b5Ac02384D5dc84677b0

Type of structure: blockchain

Time blocks generator: 1 sec

Currency name: Scrooge Coin

Currency amount: 2^{25} coins

Currency mining: no

Currency mining amount: 15 coins in block

Consensus Algorithm: PoS(50 %) + PoW(30%) + PoA(20%)

Nodes List IP(can update): {111.222.1.2; 113.21.23.4}

3 Delta smart-contracts

Smart contract it's core Delta Platform. Smart contract based on theory of semantic programming and have very many good properties.

3.1 Smart Contract how logic Δ_0^* -formula We can translate Delta smart

contract code to logic Δ_0^* -formulas[2] and get all info about our contract. We can verify contracts, translate into text documents for users languages. Delta Smart Contract Language is not Turing Complete, but 99.999% all business processes covered our language. And we have contracts verification - it's a big plus. Also we can convert users documents and Δ_0^* -formulas in our Delta Smart Contracts.

3.2 Smart Contracts and virtual machine For every computation need have a virtual machine(VM). VM execute our smart contracts and return result. We can convert Delta smart contract in any Turing complete language and special program code of any Turing complete language into Δ_0^* -logic programm.

3.3 Smart Contracts and blockchain If we want find smart contract parameter, we will find last block who contain this info about this smart contract and about this parameter.

4. Mining and master blockchain

1. Miner add transactions in block.
2. Miner execute transactions code on own VM and save final params in block.
3. Miner math generate block hash from tx, final params and other info.
4. Miner add block in NODE.
5. Other NODES can check this solution on own VM and if it's not correct decline this block.

5. Balance and smart contract params

1. We see on balance operations how on smart contract function send.
2. Every transactions execute on VM and generate a new params for address balance or contract params values. This params save in block and add in blockchain.
3. If we want get some params value, we will find last value in master blockchain for this param.
4. Every block sign with block owner signature. And users can't do fake blocks, because need find hard hash for block.

6. Exchange info among NODES.

1. We saved merkle tree hash parents blocks in every new block.
2. We can compare merkle tree hash node1 and node2.
3. If node2 contain info about new blocks, node1 can get info from node2 about this blocks.
4. More hardest path in blockchain tree only true path.

5. Every node have list of other nodes and can get info about this nodes.

Bibliography

1. Goncharov S.S, Nechesov A.V, Sviridenko D.I.
THE COMPUTABILITY VIA DEFINABILITY IN SEMANTIC MODELING
http://www.pdmi.ras.ru/EIMI/2018/LP/lp_2018-abstracts.pdf
2. Goncharov S.S, Nechesov A.V, Sviridenko D.I.
 Δ_0 – Terms and principles of Δ_0 –enrichment and Σ –reflection.
3. Ershov Yu. L. Definability and Computability // New York: Kluwer Academic/Consultants Bureau (Siberian School of Algebra and Logic). 1996. xiv+264 p.
4. Goncharov S.S., Conditional Terms in Semantic Programming, Siberian Mathematical Journal, 2017, V 58, No5, P. 794-800.
5. Goncharov S.S., Sviridenko D.I. Σ -programming // Transl., II.Ser., Am. Math. Soc. 1989. V. 142. P. 101–121.
6. Ershov Yu. L., Goncharov S. S., Sviridenko D. I. Semantic programming // Information processing 86: Proc. IFIP 10-th World Comput. Cong. Dublin. 1986. V. 10. P. 1113–1120.
7. Goncharov S. S., Sviridenko D. I. Theoretical aspects of Σ -programming // Lect. Notes Comp. Sci. 1986. V. 215. P. 169–179.